

We claim:

1 1. A method for inhibiting metastatic tumors in a mammal suffering from one or more
2 metastatic tumors, said method comprising administering to the mammal a therapeutically effective
3 amount of a DNA sequence comprising a constitutive promoter operatively linked to a transcription
4 sequence; wherein the transcription sequence, when transcribed, produces a messenger RNA
5 sequence that comprises a translatable sequence encoding a toxin, and an untranslated sequence;
6 wherein the untranslated sequence inhibits translation of the toxin sequence in the absence of
7 eukaryotic initiation factor eIF4E, and wherein the untranslated sequence allows translation of the
toxin sequence into a toxin in the presence of eukaryotic initiation factor eIF4E.

1 2. A method as recited in Claim 1, wherein the untranslated region comprises the 5'
2 untranslated sequence of fibroblast growth factor-2; whereby, in a metastatic tumor cell in which the
3 presence of eukaryotic initiation factor eIF4E allows the translation of the toxin, the toxin is
4 translated to kill the tumor cell; and whereby the majority of non-tumor cells in the mammal are not
5 killed due to the low levels of eukaryotic initiation factor eIF4E typically present in non-tumor cells.

1 3. A method as recited in Claim 1, wherein the untranslated region comprises the 5'
2 untranslated sequence selected from the group consisting of proto-oncogene *c-myc*, cyclin D1,
3 vascular endothelial growth factor, and ornithine carboxylase; whereby, in a metastatic tumor cell in
4 which the presence of eukaryotic initiation factor eIF4E allows the translation of the toxin, the toxin
5 is translated to kill the tumor cell; and whereby the majority of non-tumor cells in the mammal are
6 not killed due to the low levels of eukaryotic initiation factor eIF4E typically present in non-tumor
7 cells.

1 4. A method as recited in Claim 1, wherein the encoded toxin is a conditional toxin.

1 5. A method as recited in Claim 4, wherein the encoded conditional toxin is a herpes
2 thymidine kinase; and wherein the method additionally comprises administering an effective amount
3 of ganciclovir to the mammal; whereby, in a metastatic tumor cell in which the presence of eukaryotic
4 initiation factor eIF4E allows the translation of herpes thymidine kinase, and in which ganciclovir is
5 taken up by the cell, the translated herpes thymidine kinase in the cell phosphorylates the ganciclovir,
6 allowing the phosphorylated ganciclovir to kill the tumor cell; and whereby the majority of non-tumor
7 cells in the mammal are not killed due to the low levels of eukaryotic initiation factor eIF4E typically
8 present in non-tumor cells.

1 6. A method as recited in Claim 5, wherein the untranslated region comprises the 5'
2 untranslated sequence of fibroblast growth factor-2.

1 7. A method as recited in Claim 5, wherein the untranslated region comprises the 5'
2 untranslated sequence selected from the group consisting of proto-oncogene *c-myc*, vascular
3 endothelial growth factor, and ornithine decarboxylase.

1 8. A method as recited in Claim 1, wherein the untranslated sequence comprises mRNA
2 with a hairpin conformation having a stability of $\Delta G \geq 50$ Kcal/Mol.

1 **9.** A method as recited in Claim 1, wherein the metastatic tumor is associated with a
2 mammalian cancer selected from the group consisting of bladder, breast, cervical, colon, prostate, and
3 head and neck.

1 **10.** A DNA sequence for administering to a mammal to inhibiting one or more metastatic
2 tumors, said sequence comprising a constitutive promoter operatively linked to a transcription
3 sequence; wherein the transcription sequence, when transcribed, produces a messenger RNA
4 sequence that comprises a translatable sequence encoding a toxin, and an untranslated sequence;
5 wherein the untranslated sequence inhibits translation of the toxin sequence in the absence of
6 eukaryotic initiation factor eIF4E, and wherein the untranslated sequence allows translation of the
7 toxin sequence into a toxin in the presence of eukaryotic initiation factor eIF4E.

1 **11.** A DNA sequence as recited in Claim 10, wherein the untranslated region comprises
2 the 5' untranslated sequence of fibroblast growth factor-2; whereby, in a metastatic tumor cell in
3 which the presence of eukaryotic initiation factor eIF4E allows the translation of the toxin, the toxin
4 is translated to kill the tumor cell; and whereby the majority of non-tumor cells in the mammal are
5 not killed due to the low levels of eukaryotic initiation factor eIF4E typically present in non-tumor
6 cells.

1 12. A DNA sequence as recited in Claim 10, wherein the untranslated region comprises
2 the 5' untranslated sequence selected from the group consisting of proto-oncogene *c-myc*, vascular
3 endothelial growth factor, and ornithine decarboxylase; whereby, in a metastatic tumor cell in which
4 the presence of eukaryotic initiation factor eIF4E allows the translation of the toxin, the toxin is
5 translated to kill the tumor cell; and whereby the majority of non-tumor cells in the mammal are not
6 killed due to the low levels of eukaryotic initiation factor eIF4E typically present in non-tumor cells..

1 13. A DNA sequence as recited in Claim 10, wherein the encoded toxin is a conditional
2 toxin.

1 14. A DNA sequence as recited in Claim 13, wherein the encoded conditional toxin is a
2 herpes thymidine kinase; and wherein the method additionally comprises administering an effective
3 amount of ganciclovir to the mammal; whereby, in a metastatic tumor cell in which the presence of
4 eukaryotic initiation factor eIF4E allows the translation of herpes thymidine kinase, and in which
5 ganciclovir is taken up by the cell, the translated herpes thymidine kinase in the cell phosphorylates
6 the ganciclovir, allowing the phosphorylated ganciclovir to kill the tumor cell; and whereby the
7 majority of non-tumor cells in the mammal are not killed due to the low levels of eukaryotic initiation
8 factor eIF4E typically present in non-tumor cells.

1 15. A DNA sequence as recited in Claim 14, wherein the untranslated region comprises
2 the 5' untranslated sequence of fibroblast growth factor-2.

1 **16.** A DNA sequence as recited in Claim 14, wherein the untranslated region comprises
2 the 5' untranslated sequence selected from the group consisting of proto-oncogene *c-myc*, vascular
3 endothelial growth factor, and ornithine decarboxylase.

1 **17.** A DNA sequence as recited in Claim 10, wherein the untranslated sequence comprises
2 mRNA with a hairpin conformation having a stability of $\Delta G \geq 50$ Kcal/Mol.

1 **18.** A DNA sequence as recited in Claim 1, wherein the metastatic tumor is associated
2 with a mammalian cancer selected from the group consisting of bladder, breast, cervical, colon,
3 prostate, and head and neck.